ABSTRACT OF THE DISCLOSURE

Surface-enhanced Raman spectroscopy (SERS) uses nanoscale metal particles (SERS-active particles) or surface roughness to enhance the Raman signal of Raman-active analytes contacting the surface. SERS sandwich particles contain SERS-active particles sandwiching a Raman-active substance and serve as optical tags. Preferably, the particles are rod-shaped, with each layer (SERS-active and Raman-active) formed as a distinct stripe of the particle. These freestanding particles can be derivatized with surface ligands capable of associating with analytes of interest in, for example, a biological sample. The acquired Raman spectrum of the particle encodes the identity of the ligand. Because of the simplicity and intensity of Raman spectra, highly multiplexed assays are capable using SERS particles with different Raman-active species.

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